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14. ABSTRACT
The study is designed to evaluate the utility of levels of two phospholipids in serum as a marker of past drinking behavior across month-level time horizons, in an attempt to improve ability to measure alcohol quantity consumed and associated damage better than can be done with ethyl alcohol level measures and other existing tests that only measure very recent exposure and poorly reflect quantity consumed. This will be achieved by correlating detailed questionnaire data on alcohol consumption with serum phospholipid levels in subjects not selected for alcohol abuse (part I) and subjects under alcohol abuse treatment (part II). The Department of Defense-funded study will conduct Part I at the VA hospital and Part II at the Fairbanks treatment facility. Part I involves a single study session (n=280), while Part II will involve serial blood draws and phospholipid measures at several treatment visits (n=60). The study is open to 280 subjects for Part I, and 60 subjects for part II. Part I has 179 consented, and 18 screen fails; Part II has 33 consented (one withdrew from the study) and 8 screen fails. The study is currently active and analysis has not been completed. Since the inception of the study, we have not experienced any problems with subjects' recruitment. To date, we have recruited 197 subjects into Part I of the study and 41 subjects into part II.

15. SUBJECT TERMS
Phospholipids as Biomarkers of Excessive Alcohol Use

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INTRODUCTION:

Our proposal is to determine the diagnostic utility of sphingomyelin (SM) and lysophosphatidylcholine (LPC) as the potential biomarkers to screen for excessive alcohol use (EAU); a rising epidemic reported to be as high as 40% among returning veterans. Drinking becomes excessive when it causes or elevates the risk for alcohol-related problems or complicates the management of other health problems. According to the NIH/NIAAA, excessive drinking is defined as men who drink more than 4 standard drinks in a day (or more than 14 per week) and women who drink more than 3 drinks in a day (or more than 7 per week). Non-civilian military personnel have been deployed in support of the war efforts in Afghanistan (Operation Enduring Freedom, OEF) and Iraq (Operation Iraqi Freedom, OIF) since September 11, 2001. These sustained combat operations have resulted in military personnel experiencing physical threat or actual injury during the deployment and difficult adjustments during post-deployment period. Negative life stress is a major contributor to the onset and exacerbation of EAU. The prevalence of EAU is alarming, and the vigilance and action to identify veterans with EAU is of importance. The consequences of under-detection of EAU, thus delayed intervention are serious because relative risk of alcohol-related health conditions such as cirrhosis, pancreatitis, and hepatocellular carcinoma, is increased with the amounts and duration of alcohol consumed per day. We hypothesize that alcohol consumption elevates a panel of serum phospholipids (sphingomyelin, and lysophosphatidylcholines) in proportion to the level of consumption in the past month. Further, we hypothesize that such relationship can also be identified from a dried blood spot via a finger-stick procedure. The *central objective* of this proposal is to determine the diagnostic values of these two phospholipids as the potential biomarkers for EAU. We plan to recruit subjects to determine the relationship between the panel of serum phospholipids of interest and the amount of alcohol consumption during the past month in returning Indiana OEF/OIF veterans.

KEYWORDS: Excessive alcohol use, phospholipids, biomarkers

OVERALL PROJECT SUMMARY:

Recruitment: Since the inception of the study, we do not experience any problems with subjects' recruitment. We received the final data on serum metabolome and now in the final stage of data analyses linking serum data to clinical characteristics as well as drinking history.

KEY RESEARCH ACCOMPLISHMENTS: Nothing to report at this stage

CONCLUSION: Our project is significant to military personnel including the veterans. If successful, we expect to identify the non-invasive markers that can be used in clinical practice to screen for excessive alcohol use.

PUBLICATIONS, ABSTRACTS, AND PRESENTATIONS:

I would like to thank the DoD for support of my research. Because of the protected time that I received, I would be able to use this time to publish several papers (cited the DoD support) below.

Because of the support from the DoD, the following publications are partly supported by this grant (through the PI effort)

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17. Zhou P, Ross RA, Pywell CM, Liangpunsakul S, Duffield GE. Disturbances in the murine hepatic circadian clock in alcohol-induced hepatic steatosis. Sci Rep 2014;4:3725.

INVENTIONS, PATENTS AND LICENSES: N/A

REPORTABLE OUTCOMES: Nothing to report at this time

OTHER ACHIEVEMENTS: Nothing to report

If you have any questions or concerns, please do not hesitate to contact me.

Sincerely,

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